

CLAIMS

What is claimed is:

1. A process for making olefins, the process comprising:
 - (A) providing a process water comprising at least a portion of a product water from a hydrocarbon synthesis process, wherein the process water contains organic compounds;
 - (B) producing steam from the process water, wherein the steam includes at least a portion of the organic compounds from the process water; and
 - (C) feeding the steam and a hydrocarbon feedstream containing a light hydrocarbon into a steam cracker under suitable cracking conditions so as to crack in the presence of the steam at least a portion of the light hydrocarbon and at least a portion of the organic compounds from the steam and to form a steam cracker effluent, wherein the steam cracker effluent comprises at least one olefin.
2. The process according to claim 1, wherein the hydrocarbon synthesis process of step (A) comprises a Fischer-Tropsch synthesis.
3. The process according to claim 1, wherein the organic compounds comprise oxygenated organic compounds.
4. The process according to claim 3, wherein the organic compounds comprise at least one oxygenate selected from the group consisting of alcohols, aldehydes, ketones, esters, aldols, ethers, acids, carboxylic anions, and combinations thereof.

5. The process according to claim 1, wherein the process water of step (A) further includes water from at least one source selected from the group consisting of a syngas reactor, a hydroprocessing unit, a water stripper, a cooling unit, a catalyst regenerator, a catalyst activator, and a fractionator.
6. The process according to claim 1, further comprising treating the process water prior to step (B).
7. The process according to claim 1, wherein the light hydrocarbon comprises a naphtha fraction, a diesel fraction, or combination thereof.
8. The process according to claim 7, wherein at least a portion of the naphtha fraction is derived from a Fischer-Tropsch synthesis.
9. The process according to claim 7, wherein at least a portion of the diesel fraction is derived from a Fischer-Tropsch synthesis.
10. The process according to claim 1, wherein the hydrocarbon feedstream further comprises conventional refinery naphtha, ethanol, or combination thereof.
11. The process according to claim 1, wherein step (C) further employs a steam to light hydrocarbon molar ratio of from about 3:7 to about 7:3.

12. The process according to claim 1, wherein the at least one olefin comprises ethylene, propylene, or combination thereof.
13. The process according to claim 1, further comprising hydrotreating the hydrocarbon feedstream prior to step (C).
14. A process for producing olefins and hydrocarbons, the process comprising:
 - (A) feeding a syngas stream comprising hydrogen and carbon monoxide to a hydrocarbon synthesis reactor under suitable conversion promoting conditions;
 - (B) converting at least a portion of the syngas stream to water and hydrocarbons in the hydrocarbon synthesis reactor so as to produce a hydrocarbon synthesis effluent gas and a hydrocarbon synthesis product, wherein the hydrocarbon synthesis effluent gas comprises at least a portion of said produced water, and wherein the hydrocarbon synthesis product comprises hydrocarbons;
 - (C) passing the hydrocarbon synthesis effluent gas in a separation unit so as to collect a product water stream, wherein the product water stream comprises organic compounds;
 - (D) fractionating the hydrocarbon synthesis product to at least form one light hydrocarbons fraction and one heavy hydrocarbons fraction;
 - (E) providing a process water comprising at least a portion of the product water stream;

- (F) feeding the process water into a steam generator to form steam, wherein the steam includes at least a portion of the organic compounds from the portion of the product water stream; and
 - (G) feeding said steam and at least a portion of the light hydrocarbons fraction into a steam cracker under suitable cracking conditions so as to crack at least a portion of the light hydrocarbons fraction and at least a portion of the organic compounds from the steam to produce a steam cracker effluent, wherein the steam cracker effluent comprises at least one olefin.
15. The process according to claim 14, wherein the hydrocarbon synthesis reactor comprises a Fischer-Tropsch synthesis.
16. The process according to claim 15, wherein the product water stream collected in step (C) comprises oxygenated organic compounds.
17. The process according to claim 15, wherein the product water stream collected in step (C) comprises at least one oxygenate selected from the group consisting of alcohols, aldehydes, esters, aldols, ethers, acids, carboxylic anions, and ketones.
18. The process according to claim 14, further comprising hydrotreating the hydrocarbon synthesis product produced in step (B).

19. The process according to claim 14, further comprising hydrotreating the light hydrocarbons fraction produced in step (D).
20. The process according to claim 14, wherein the portion of the light hydrocarbons fraction in step (G) comprise a naphtha cut.
21. The process according to claim 14, wherein the process water of step (E) further comprises water from at least one source selected from the group consisting of a syngas reactor, a hydroprocessing unit, a fractionator, a cooling unit, a catalyst regenerator, a catalyst activator, and a water stripper.
22. The process according to claim 14, further comprising treating the process water prior to step (F).
23. The process according to claim 14, wherein step (G) further comprises feeding to the steam cracker at least one material selected from the group consisting of a crude oil-derived naphtha, crude oil-derived diesel, and an ethanol.
24. The process according to claim 14, wherein step (G) further employs a steam to light hydrocarbon molar ratio of from about 3:7 to about 7:3.
25. The process according to claim 14, wherein the at least one olefin comprises ethylene, propylene, or combination thereof.

26. The process according to claim 14, wherein the steam cracker effluent comprises at least about 40 weight percent of one or more olefins.
27. The process according to claim 14, wherein the steam cracker effluent comprises at least about 20 weight percent ethylene.
28. The process according to claim 14, wherein the steam cracker effluent comprises at least about 5 weight percent propylene.
29. The process according to claim 14, wherein the process further comprises reacting a feedstream in a syngas reactor to produce the syngas stream.
30. The process according to claim 29, wherein the syngas reactor further generates a syngas reactor water, and wherein the process water provided in step (E) comprises at least a portion of said syngas reactor water.